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*Sallie D. Allen, Editor*

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### Cover Illustration

Phyllitis scolopendrium  
'Laceratum Kaye's Variety'  
See page 38  
Sylvia Chelsey Smith

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# POLYPODIUM AMORPHUM SUKSDORF: ITS RESURRECTION, IDENTIFICATION, AND CULTURE

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## Introduction

The western United States is the home of an interesting group of ferns that belong to the *Polypodium vulgare* complex. This group has a distribution around the northern hemisphere, from Siberia east to North America and Europe. In the broad sense, the complex consists of a series of interrelated species of varying chromosome number and distinct morphology that freely hybridize to form mostly sterile hybrids.

My 1965 Ph.D. thesis represents one of the first major cytotaxonomic studies of any fern group in North America. The results of my investigation of the *Polypodium vulgare* complex were published in two parts (Lang 1969, 1972). These papers can be consulted for details (keys, descriptions, and illustrations) concerning the taxonomy and relationships of the three polypodies of the complex in northwestern North America: *P. glycyrrhiza* D.C. Eaton, a diploid; *P. hesperium* Maxon, a tetraploid; and what I named *P. montense* F. A. Lang, another diploid, now correctly known as *P. amorphum* Suksdorf. In this article, I would like to explain why a new name was selected for *P. amorphum*, and why it has been changed back again, how you can distinguish the species from *P. hesperium*, and some tips on keeping the plant happy in cultivation.

## The Names: *Polypodium montense* or *P. amorphum*?

The British botanist, Irene Manton (1950) and her students, developed a squash technique for the study of fern chromosomes. The ability to examine fern chromosomes, count them, and observe their pairing behavior at meiosis greatly increased our understanding of many of the complex taxonomic and evolutionary relationships in various fern groups.

Just before I began my work on the polypodies of the Pacific Northwest, Manton's student, Molly Shivas (1961a and b), published a remarkable piece of work on the complex in Europe that greatly influenced my activities. By analyzing chromosome numbers and pairing at meiosis in wild populations, and in carefully synthesized hybrids, Shivas demonstrated that there were three main species in Europe: a diploid with the normal set of 37 paired chromosomes at meiosis, *P. australe* Fee, a tetraploid with 74 pairs, *P. vulgare* L., and a hexaploid with 111 pairs, *P. interjectum* Shivas. All combinations of sterile hybrids also were discovered. By comparing pairing of homologous chromosomes at meiosis in her synthesized hybrids, Shivas made the amazing discovery that the European *P. vulgare* might be the tetraploid derivative of two North American diploids, the eastern *P. virginianum*, and the western *P. glycyrrhiza*.

Until 1975, Article 71 was a part of the International Code of Botanical Nomenclature (Stafleu 1978). Article 71 stated that a name must be rejected if it is based on a monstrosity. Shivas in her work (1961b) rejected *P. cambricum* L. for the European diploid, because that species is based on a monstrosity; a form with finely divided pinnae segments. She chose, instead, the name *P. australe* to serve for the diploid, because the type specimen was normal in appearance, and represented the earliest validly published name.

The problem that I undertook centered around *P. glycyrrhiza* and *P. hesperium*. The species are variable with several different forms that were difficult to distinguish. As populations from throughout the Pacific Northwest were examined, it became clear that *P. hesperium*, as it was then viewed, actually consisted of diploid and a tetraploid populations. These plants were confused primarily because both possessed relatively blunt pinnae segments. Once the chromosome difference was recognized, then many other characters became evident (see Land 1972 and The Identification of *Polypodium amorphum*, below).

This discovery presented the nomenclatural question of whether the name *P. hesperium* applied to the diploid or the tetraploid forms. Examination of the type specimen and chromosome counts from plants at the type locality established that *P. hesperium* is the correct name of the tetraploid. This left the diploid without a name.

One candidate named was that of *P. amorphum*, an odd-looking plant with very short, round pinnae segments and bifurcate frond tips, known only from the type locality at Dog Creek on the Washington side of the Columbia River Gorge. To my knowledge, the species has never been seen alive by anyone other than Wilhelm Suksdorf, the original collector and author of the species. Suksdorf may have collected the taxon into oblivion by his enthusiastic collection of isotypes, or the population may have been destroyed by the location or relocation of the highway or railroad, or been immersed by the waters behind Bonneville Dam. Several attempts to locate living plants of the taxon have been previously described (Lang 1969).

Although examination of the type of *P. amorphum* revealed that it was the same as the diploid form of *P. hesperium*, I chose, following the lead of Shivas with her rejection of *P. cambricum*, to likewise reject *P. amorphum* because it too, is based on a monstrosity. The new name, *P. montense* was published to serve as the name of the diploid form.

Following Shivas' example, I felt justified in rejecting Suksdorf's name under the terms of Article 71 of the International Code. The action did not create a "superfluous and illegitimate name" as alleged by Lellinger in his recent fern book (1985). To not apply Article 71 in this instance would make one a member of that widespread family of Americans, the Scofflaws. I did not question whether or not Article 71 was a "good" article. It was in the code and I followed it.



All this was made a moot point, however, by the decision to remove Article 71 from the code at the Leningrad International Botanical Congress (Stafleu 1975). Without Article 71, both *P. montense*, with its representative type specimen, and *P. australe*, have become superfluous synonyms. The correct name for the western diploid is *P. amorphum* Suksdorf. The correct name for the European diploid is *P. cambricum* L.

Common names are frequently colloquial and in the native tongue of the local folk where the species are found. Occasionally, common names are invented by botanists from the specific epithet of the scientific name when no colloquial name exists. Often, these names fail to serve any useful purpose. Lellinger (1985) adopted the common name irregular polypody for *P. amorphum*, apparently in reference to the specific epithet *amorphum*, meaning without form or shape. This common name is totally misleading because virtually all plants of this species have normal morphology. As explained above, the abnormal form on which the name was based probably no longer exists in nature. Because of its close relationship with the rock polypody, *P. virginianum*, of the eastern United States and its preference for rock crevices, *P. amorphum* should be called the western rock polypody. *Polypodium hesperium* is the western polypody and *P. glycyrrhiza* is the licorice fern (because of its sweet licorice tasting rhizome).

#### The Identification of *Polypodium amorphum*

An earlier paper, (Lang 1972), provides keys and illustrations for the members of the complex in the Northwest and their hybrids. The following features (and the accompanying illustration) will serve to distinguish the western rock polypody from the western polypody if the ferns are closely examined with a X10 hand lens (not held at hands-length), and if your taste buds are functioning correctly:

1. The pinnae segments are relatively short and rounded, rather than elongated and acute to attenuate.
2. The sori are circular and closer to the margin than the midrib, rather than circular or oval and midway between the margin of the pinnae segment and the midrib.
3. There are strange looking sterile hairs (paraphyses) scattered in among the sporangia that are usually darker than the more numerous sporangia and have tiny whitish glandular hairs. They sometimes fall off or obscured with the opening of the sporangia. Paraphyses are absent in the other species.
4. The frond midrib has a few small flat multicellular scales attached by a single stalk.
5. The scale on the rhizome has a darker strip along the center of its length and has a coarsely toothed margin. The other species have a uniformly colored, more finely toothed scale.
6. The rhizome has an acrid, rather than a sweet taste.

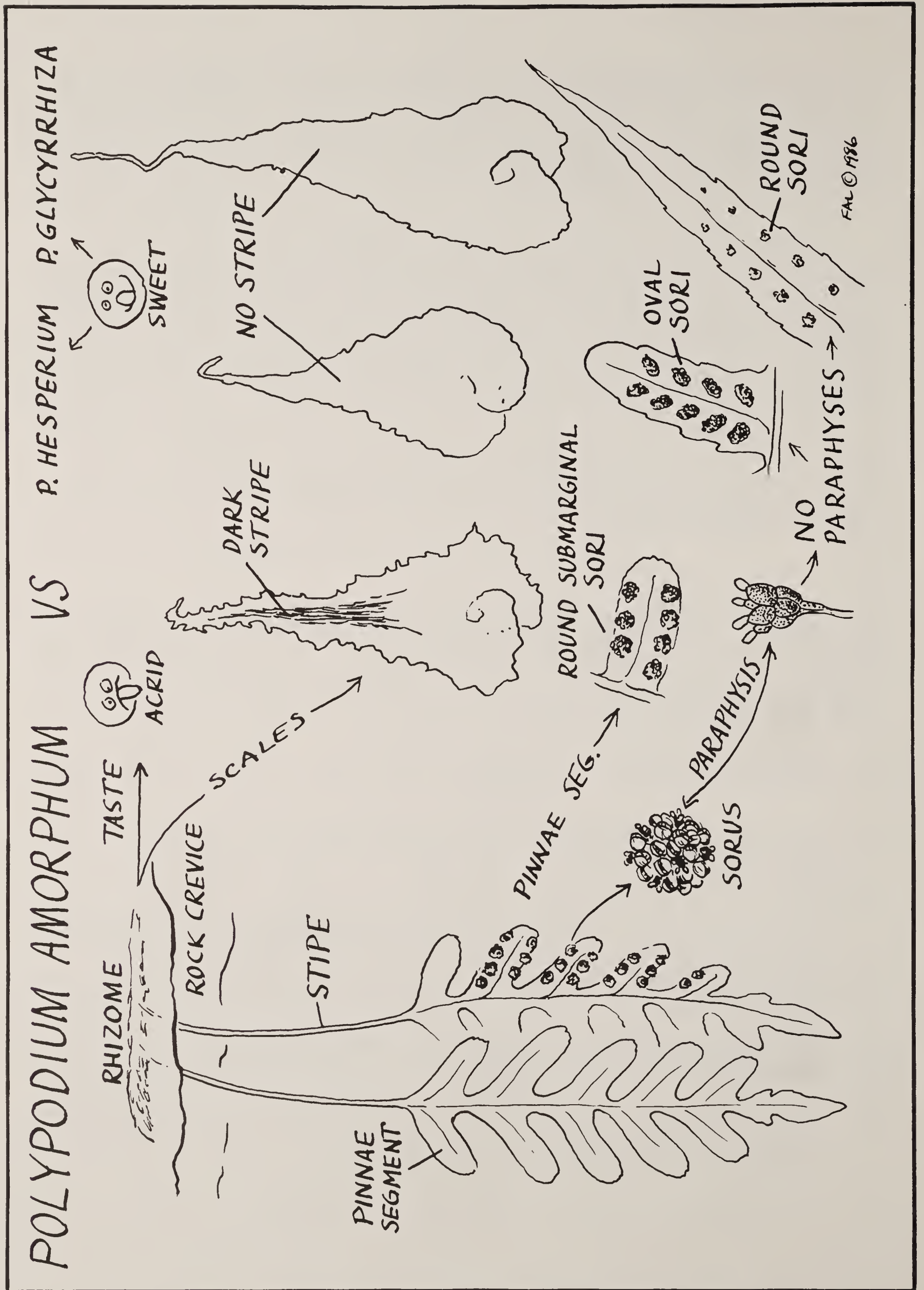


Fig. 1  
Polypodium amorphum  
Frank A. Lang



7. The rhizome grows in rock crevices, rather than over the surface of the substrate.

If all these features are present, the plant in question is almost certainly *P. amorphum*. The boundaries between *P. amorphum* and *P. hesperium* can become fuzzy because of the occasional formation of triploid morphologically intermediate hybrids.

The species has been a constant source of confusion, even after the publication of my work. Taylor (1970), my major professor for my thesis research, called *P. amorphum*, a synonym of the tetraploid *P. hesperium*, which it is not. He also stated that glandular paraphyses were very rare in *P. amorphum*; they are common. Mickle (1979) thinks *P. amorphum* is a diminutive form of *P. hesperium*; it is not. Lellinger (1985) thinks *P. amorphum* is one of the possible diploid parents of the European tetraploid *P. vulgare*, along with the eastern North American diploid *P. virginianum*. This is a virtual impossibility since *P. amorphum* shares so many characters with *P. virginianum*. The parentage of *Polypodium vulgare* (Shivas 1961) is shared between a diploid *P. virginianum* type (perhaps *P. amorphum*) and *P. glycyrrhiza*, the source of its sweet rhizome.

#### Culture

*Polypodium amorphum* can be a somewhat difficult fern to keep happy. After some failures with the usual drained mixes, I have been able to keep it in pots with a mixture of Live Earth brand commercial potting mix, fine sand, and pea gravel. Mix the soil and sand in equal measure, then add one-third pea gravel to two-thirds soil and sand. Place pot shards over the drainage holes in the pots to insure good drainage.

My plants are in both plastic and clay pots, buried in soil outside the college greenhouses on the north side, and in a shady protected spot in the northwest corner. The area is watered by automatic sprinklers every day for ten minutes in the early morning. Considering the long, hot, dry summers in Ashland, the plants are doing remarkably well.

Because it prefers rock crevices in the wild, I suspect that the fern would be happiest adorning a dry stone retaining wall of basalt rocks. The rhizomes should be included in deep crevices as the wall is constructed.

If you have a fern that you think is *P. amorphum* that is growing over the surface of soil or rocks with wild abandon, you probably misidentified the species. It is more likely *P. hesperium*, or one of its hybrids with *P. amorphum* or *P. glycyrrhiza*.

#### Summary

The correct name of *Polypodium montense* F.A. Lang, is *P. amorphum* Suksdorf. The common name, western rock polypody, is proposed. This species is distinguished from others in its range by its relatively blunt pinnae segments, thin acrid rhizome with bicolored scales, round submarginal sori with paraphyses, and a preference for rock crevices.

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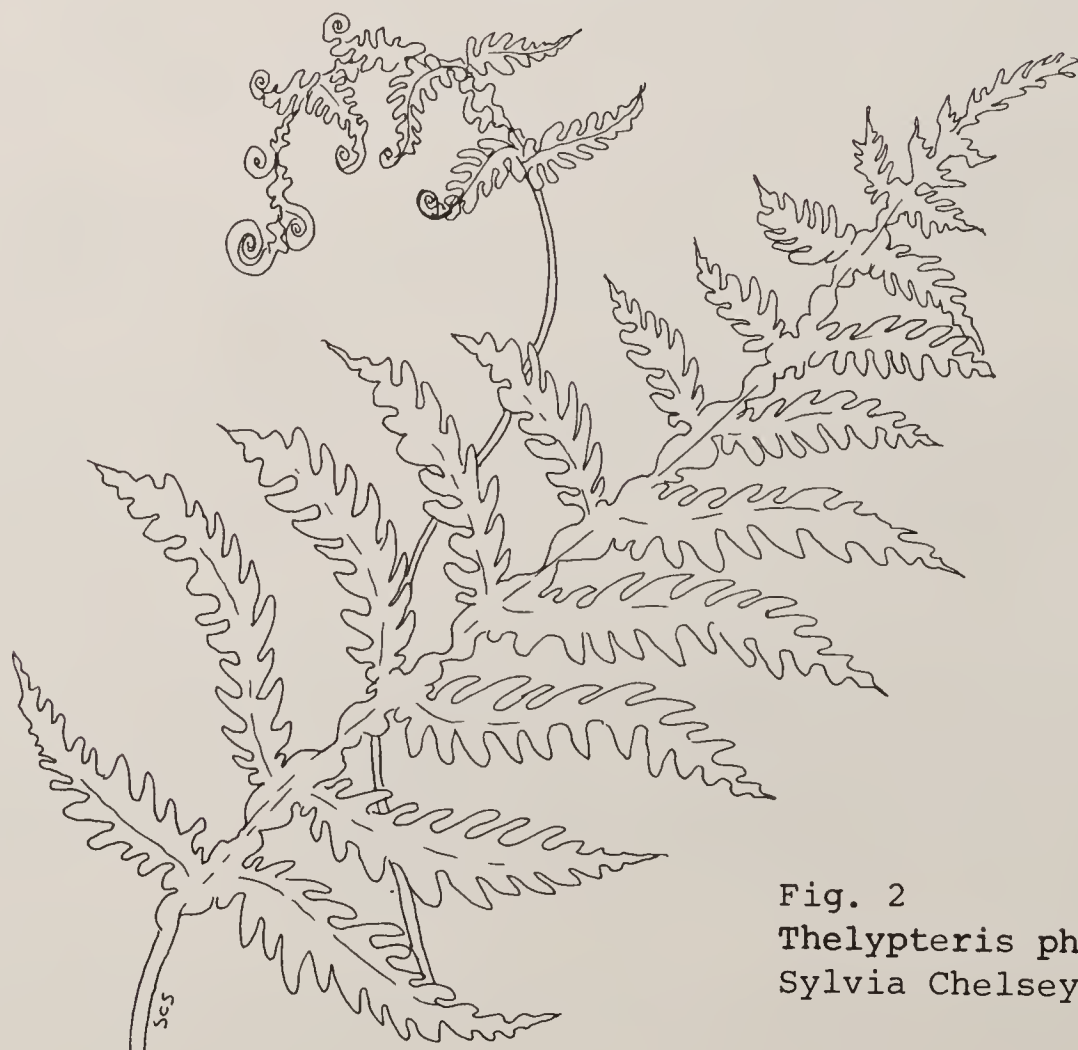


Fig. 2  
*Thelypteris phegopteris*  
 Sylvia Chelsey Smith



# THE FERN FISHERMAN: A NEW ZEALAND STORY

George Schenk, Auckland, New Zealand

New Zealand, with the world's greatest diversification of form among its native ferns, might well be considered the world capital of fernkind. In fact, that notion is somewhat recognized in one of the country's two popular symbols (the morose-appearing kiwi is the other), a frond of silver fern (*Cyathea dealbata*) displayed on flags, pennants, and blazers. Ferns have always stood as hearty as a rugby crowd and as numerous, in the woods of the land...but not always so in its gardens.

Until 1976, a mere handful of fern varieties were offered by New Zealand nurseries; these were collected natives and non-natives grown from division. Virtually no ferns were being grown from spores. All that has changed with the work of a former fisherman, Noel Crump, of the Auckland area. Ferns had been his hobby for years. He mulled over his feeling that the paucity of ferns in New Zealand nurseries frustrated not only himself, but probably a mass of gardeners. There was, he felt, a sizable market awaiting, and gambling on his instincts, he quit fishing and plunged into fern production.

Now, a decade later, he sells tens-of-thousands of ferns annually, of 200 kinds, primarily species, but many foliage forms as well. Mr. Crump's ferns sell mainly to gardeners in Auckland, a city of 800,000, and its surrounding communities; all his business takes place in a nation of merely 3,100,000 people (and 75 million sheep, one might add).

The Crump fern nursery is located in the farm and pasture district of Whenaupai outside Auckland, an area open for miles around to the considerable winds and summer droughts of North Island, New Zealand. Shade and shelter for ferns are provided by 25,000 square feet of shade houses: skeletal timber structures covered with soft, green-colored nylon netting. This New Zealand-made material is designed to block out 50 percent of the sun, and so, create an intensity of shade optimum to ferns and nearly all shade plants. Noel Crump built his nylon shade houses seven-and-one-half years ago, and judges that the material will be good for another seven-and-one-half years.

Heavy snowfall in one's region would seem the only deterrent to using this light and graceful new stuff. I do not know what is going on in California or in other states with areas where winters are snowless, but in North Island, New Zealand, and also in the Philippines, I notice shade houses of nylon netting have lately made lath houses obsolete. Nearly every nursery in need of shade now uses this new material. The netting will take a certain...unknown...weight of snow. In New Zealand's snowy South Island, nurseryman James Le Comte is experimenting with nylon netting, and he tells me that a shade roof formed of it has withstood a four-inch depth of dry snow without damage. The material bellied with the weight of the snow, but tautened up again when the snow melted.

Noel Crump grows his ferns from spores obtained from Societies and individuals around the world. His private collection now amounts to 750 kinds, and he intends to make it public eventually by turing his property into a botanical park. Chief sources have been the American Fern Society (through correspondence with Seattle's Neill Hall, who has handled the spore exchange for many years) and the Los Angeles Fern Society. The spores are sown on peat and sand, and the sporeling plants are potted up--correction--bagged up in the same rooting mix. Polythene bags, ugly black, but ever so handy, light-weight, tough, cannot cut your hands, and a beauty when it comes to disposing of them--are now used by North Island nurseries for the growing of all plants, except aquatics, wash tub-sized bags for growing trees, popcorn bag size bags for ferns, tobacco poke-size bags for alpine plants; these same black bags are also being used by rock garden nurseries in England. I seem to be telling a tale of plastics as much as ferns, but it undoubtedly forecasts something of the future of production in western North America.

The Crump Fern Nursery, whose total staff and management consists of the man himself, together with his wife, Fijian-born of Indian ancestry, and one helper, a pleasant, grandmotherly woman of New Zealand-English stock, now produces its 200 kinds of ferns in yearly lots of 3,000 for the best selling kinds. Lesser sellers are produced in lesser amounts, and stocks of collectors' oddities of limited to no more than a couple dozen. The best sellers are plants that must attract Sunday gardeners at neighborhood nurseries supplied by Mr. Crump, gardeners who know nothing about ferns, except that this frond structure haunts them into buying the plant.

Among the top ferns are: *Asplenium bulbiferum*, *Dryopteris atrata*, *D. erythrosora*, *Polystichum braunii* (the evergreen Japanese form of the species), *P. polyblepharum*, and several *Pteris*, especially the Australian species, *P. pacifica* and *P. umbrosa* (similar to *P. cretica*, that favorite house plant in northern climes).

The thousands of ferns that this nursery turns out each year represent a major part of the country's total production, but by no means the whole of it. Several smaller fern nurseries have started up, inspired by Noel Crump's success, and these companies produce thousands more plants.

The message for North America from New Zealand is that there probably exists, in our general gardening population, as in New Zealand a few years ago, a great and starved interest in ferns. So far, our nurseries are only timidly serving up the goods.\* How many more hardy ferns than are now being supplied should sell if placed before the American public? Ferns for the open ground, splendidly grown to about the size of a Romaine lettuce, and tapped at \$3.00 to \$6.00--the way it is being done in New Zealand. Ten-times as many? A hundred times as many? The latter multiple probably represents the increase in fern sales here in New Zealand, since Noel Crump sold his fishing gear and went ferning.

\* Editor's Note: With the exception of the greater Seattle area. See NOHS NURSERY SNOOPER; Northwest Fern Nurseries, by Pat Bender, page 45. Sue Olsen has pioneered the field, beginning her Foliage Gardens in 1972, the date of the first NOHS Fern Sale.





# FERN PORTRAITS

Sue Olsen, Bellevue, Washington

## POLYSTICHUM LEMMONII

Common Name: Shasta Fern

Description: Low growing evergreen alpine 6" to 10" tall, with relatively short stipes. The blade is fully bipinnate to almost tripinnate, often imbricate, which is more pronounced so in appearance because of the strongly erect growth habit. The pinnae are lobed or crenate, but not toothy or spiny, an essential distinction for identification amongst our montane natives. Also, note that the frond does not taper at the base. It grows almost exclusively (99 and 44/100 percent) on serpentine (low calcium, low phosphorus, high magnesium) soil, usually amongst rocks. Sori with peltate indusium on the apical pinnae segments.

Natural Habitat: Mountains of northwestern U.S. and Canada south to northern California.

Culture and Comment: As this goes to press, the name may change again, as it has been bandied about for many years between *P. lemmonii* and *P. mohrioides* (a native of the South American Andes). While I have enjoyed speculating about the prehistoric geological wonders that landed this fern, presumably from a common mother, on two continents, the botanists have been more methodical, separating the two on the basis of spore morphology, soil preference and scale color (D. Wagner). Horticulturally, it is a challenging plant for the gardener. Spore-grown plants are essential for success. In addition, give them a cool, rocky root run and gritty soil in partial sun well away from the pounding winter rains.



Fig. 3  
*Polystichum lemmonii*  
Sylvia Chelsey Smith

## POLYSTICHUM ANDERSONII

Common Name: Anderson's Sword Fern

Description: Tall, leathery evergreen growing to 3' from a central crown; stipe cloaked with persistent scales. The dark green blades are pinnate-pinnatifid to bipinnate with spinulose tips. As its distinguishing feature, each frond bears one (rarely several) propagable bud near the tip, which can surround the plant with infants when pinned down at season's end onto the soil, or for commercial convenience, a deliberately prepared pot. Typical polystichum (many stitches) sori with peltate indusium outline the pinnae. It is presumed to be a hybrid (D. Wager) between *Polystichum munitum* and an as yet undiscovered species (field trippers take note!)

Natural Habitat: Moist woodlands of northwestern U.S. and Canada (to Alaska).

Culture and Comment: One of our rarer natives, *Polystichum Andersonii* is highly ornamental in moist shade serving in form (and with equal ease) the same function as our fellow native *P. munitum* (sword fern). The proliferous buds are a plus, as with a bit of judicious midwifery, one can have batch of progeny in a season, saving the many months of nurturing usually associated with reproducing ferns from spore. (Unlike some hybrids, however, it is fully fertile, and can be grown by the hundreds from spore.) It is fully hardy and needs only a modicum of care to shine in the shade of the woodland garden.



Fig. 4  
*Polystichum andersonii*  
Sylvia Chelsey Smith



## ASPLENIUM TRICHOMANES VAR. CRISTATUM

Common Name: Crested Maidenhair Spleenwort

Description: Low delicate evergreen usually settling into cultivation at 6" to 8". Dark stipe and rachis with pairs of small rounded pinnae. The frond tip branches into a terminal crest of three or more segments, which may subsequently divide again with minute pinnae. The linear sori line up in herringbone fashion along the veins on the underside of the fronds and open lengthwise like a clam shell. Breeds true from spore.

Natural Habitat: Rare, wild find in Great Britain.

Culture and Comment: Like the type, this variety is deliberately planted in England in old mortared walls and rubble, where it benefits from good drainage (air as well as moisture) and slowly leaching lime. Given the above requirements, it will adapt amenably to cultivation in terra firma where in the company of other lilliputian subjects, it is an excellent foreground plant for either the woodland or the portion of the rock garden which enjoys dappled shade. I am fully aware that the public is sharply divided on the subjective beauty of crested ferns (i.e., unique ornamentals versus unique monstrosities), but if ever a variety could offer a peaceful compromise, this would have to be a candidate. It is charming. It was also once considered to be a cure for baldness, so if not charmed after a season or two, it can always be plucked out and dropped into the tea of a needy relative!

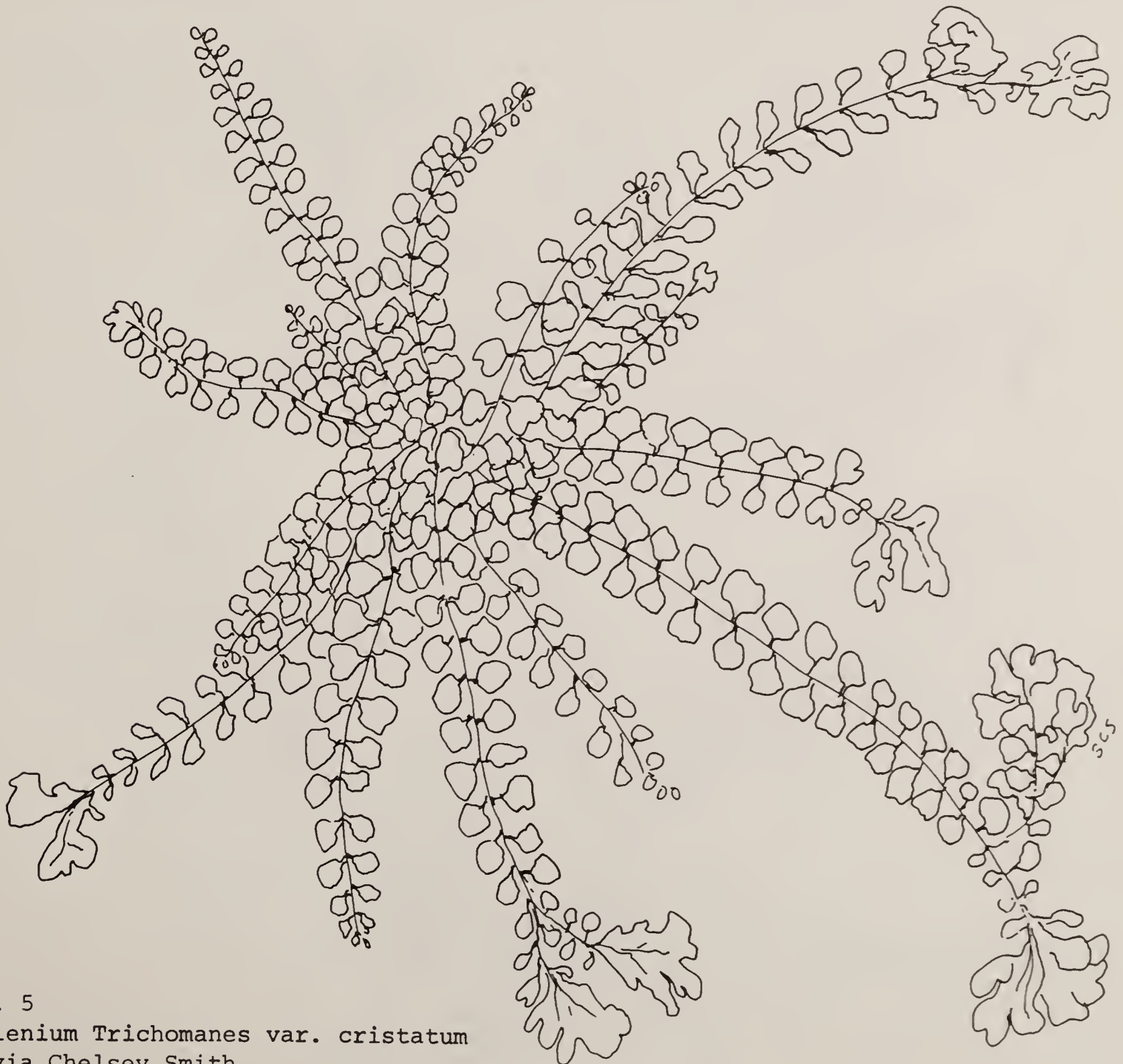


Fig. 5  
Asplenium Trichomanes var. cristatum  
Sylvia Chelsey Smith

## OSMUNDA REGALIS VAR. CRISTATA

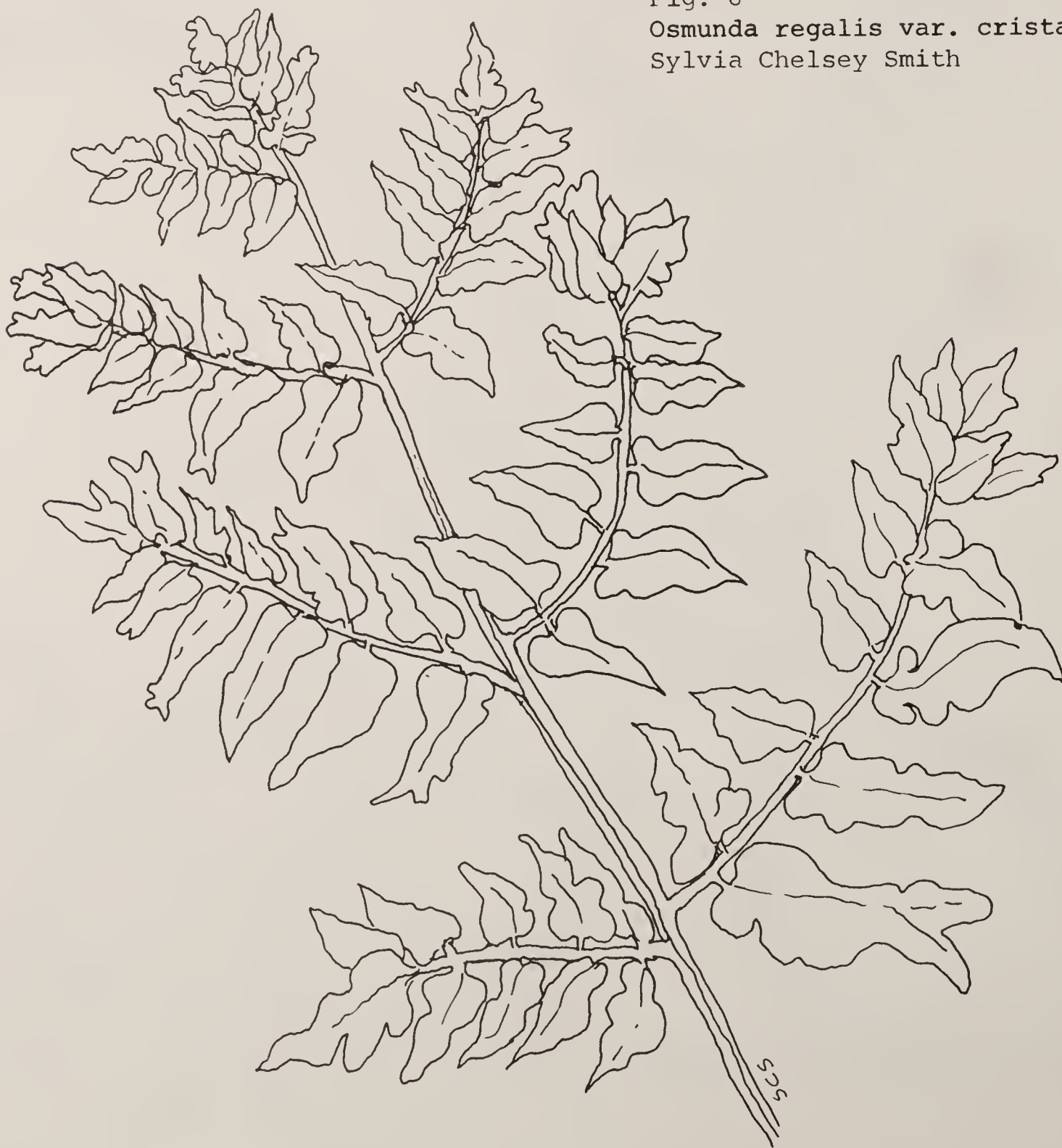
Common Name: Crested Royal Fern

Description: Tall, deciduous robust variety with soft green bipinnate fronds not typically fern-like in appearance. Pinnae variable, angulated to mildly crested with the terminal pinnae on the fertile fronds gradually altered into sporangia. As an evolutionally primitive fern, the short-lived spore produced is green when ripe and released simultaneously early in the season. (Watch for it in May! Sow it immediately and it will breed quite true and prolifically.)

Natural Habitat: Originally collected as *Osmunda regalis* in England.

Culture and Comment: The osmunda's by nature are large hardy plants and *O. regalis* var. *cristata* is no exception. R. Kaye (*Hardy Ferns*) writes that E. J. Lowe, one of Britain's 19th-century pioneer pteridologists, exhibited and won 1st prize with a specimen some fourteen feet in circumference (which leaves me as curious about the transportation committee as the fern!). But be assured that in general cultivation it is not quite so formidable (and in no way threatening to the garden or the gardener), usually growing slowly to an eventual height of 3± feet. It is an excellent companion to water in the landscape design although, as good drainage is essential, it is not truly a bog plant. With good leaf mold enriched soil, its upright, vase shaped deciduous form shares the shade well with low, early blooming evergreen ground covers, such as hepatica and synthyris.

Fig. 6  
*Osmunda regalis* var. *cristata*  
Sylvia Chelsey Smith





## CYRTOMIUM MACROPHYLLUM

Common Name: I suppose it is safe to call this the Large Leafed Holly Fern.

Description: Marginally evergreen, open growing fern, usually 18" to 2' in cultivation. The proportionately long stipe is covered with dark, lustrous scales, especially at the base. Blade pinnate with 2 to 8 pairs of papyraceous light green, mildly serrate, oblong-ovate pinnae rounded at the base and abruptly acuminate at the tip; distinctive anastomosing (netted) venation; large terminal pinna with 3 prominent dark linear veins. The small sori with peltate indusium are scattered randomly on the underside of the frond.

Natural Habitat: Woodlands: Japan, Taiwan, China and the Himalayas.

Culture and Comment: The cyrtomiums are a unique lot and, with their falcate pinnae and variations thereof, not likely to be confused with any other genus. The terminal pinna on this species is distinctly upright and trilobed, reminiscent of the tulips we were taught to draw by our second-grade art teachers. The three dark veins are especially prominent when viewing the underside, but the prize ornamentation is the readily visible netted venation which, especially with a little backlighting, is one of the delights of Mother Nature's patterns for those willing to linger and look. Surprisingly hardy, cyrtomiums acclimate to a wide range of conditions, but I think of them as one of the most willing in low light, either outdoors or in (albeit not under the porch nor, correspondingly, the bed). Reputed to be lime tolerant, but it will perform equally well in woodland duff, where it serves as a bold foil for its finer textured relatives.



Fig. 7  
Cyrtomium macrophyllum  
Sylvia Chelsey Smith

PHYLLITIS SCOLOPENDRIUM 'LACERATUM KAYE'S VARIETY'  
(Cover Illustration)

Common Name: Kaye's Hart's Tongue Fern

Description: Low growing, hardy evergreen forming a dense clump, usually less than 1' tall; broadly ovate simple fronds with fringed margins, which gives a crested appearance at the front tip. The unfurling fronds are covered with fine silvery scales, and the mature frond is a bright kelly green. Linear sori line the frond undersides in a herringbone pattern but, unlike asplenium, the indusia opens as a longitudinal slit (like a buttonhole). Unlike many P.S. variants, it comes true and quickly from spore.

Natural            Originated in the British garden of author-nurseryman, Reginald Kaye.  
Habitat:

Culture and    To the uninitiated, this variety with its chubby little shredded fronds may look  
Comment:       like an exotic form of leaf lettuce. Although the centuries old Doctrine of Signatures recommended a concoction of Phyllitis and wine as a remedy for snake bite (this presumes the plant is handy in the emergency), I recommend it for neither salad bowl nor medicine chest. Rather, group them as a foreground planting the formal landscape, tuck them in a chinky concrete wall or at patio's edge where they will benefit from the lime content, or use it as a well behaved specimen plant in a container. In any situation, it will tolerate more sun than most non-xerophytic ferns, however, if the foliage yellows, then it has been overcooked, underfed, or both.



## Fern Festival

Center for Urban Horticulture



JUNE 13<sup>th</sup>

10:12 Kruckeberg Garden Tour \$5.00  
20066 - 15th N.W. - Seattle  
(206) 546-1281

11:05 Fern Sale (at the center)

8 pm Lecture \$4.00 Ferns of Britain & Ireland  
By Chris Page - Royal Botanic Gardens of Edinburgh



JUNE 14<sup>th</sup>

10-2 Fern Sale

For Further information call  
Sue Olsen 747-2998



## FAVORITE FERNS

Margaret Mulligan, Kirkland, Washington

These are some of my favorite ferns:

*Dryopteris erythrosora* is a spectacular hardy evergreen fern. The new fronds are rose-tinted at first, becoming shining green when fully grown. Mature fronds are two feet in length and the sori on the underside is also reddish in color. It prefers to be planted in shade or partial shade. This colorful species from eastern Asia should be grown in every local garden.

*Polystichum tsus-simense* is a low-growing evergreen fern with fronds up to a foot in length. The pinnules are deeply serrated; the fronds shining dark green, but turning nearly black in the winter months, creating a most unusual color effect. It is hardy, but may be damaged in severe winters. It is used by florists in flower arrangements.

*Polystichum andersonii*, a native of the Pacific Northwest, Alaska, Idaho and Montana, is found growing in cool woods. It is partially evergreen, retaining the old fronds through the winter; partial shade suits it best. It is often mistaken for *P. munitum*, our sword fern, but differs in its more deeply serrated pinnules, in the dense covering of chaffy scales on the stem (rachis) at the base of the frond, and in forming bulbils on the rachis at the top of the frond. These form an easy means of propagating this choice fern.

Another, but less hardy species, is *Doodia media*, native to various islands in the Pacific Ocean. This has a dainty arching habit, the fronds 12 to 15 inches long, tending to be pinkish in color when young. In the last two rather severe winters, this fern suffered badly outside but, fortunately, I had kept one in a pot in the greenhouse as a precaution.

*Ceterach officinarum* grows most happily in limestone walls, or in rubble from them, or on rocky outcrops of limestone. The short-stalked, pinnatifid fronds are only three to six inches long, leathery in texture, and light green in color. The back of the frond is covered with silvery hairs, which turn brown as the season progresses. In Great Britain, many farm walls are often covered with these delightful ferns, accompanied by *Asplenium trichomanes* and *A. ruta-muraria*, the wall-rue spleenwort.

There are several adiantums, all beautiful plants with feathery fronds. I shall mention only two, the first being the Himalayan *Adiantum venustum*, an entirely hardy species in a shady place which seems not to require much moisture, but enjoys plenty of humus in the soil. The fronds are triangular in shape, tri-pinnate, six to eight inches long, dropping so as to cover the rhizomes, and having a slight bluish cast when young. In maturity, they are a brilliant green and are retained through the winter. These plants form a green carpet in time with the rhizomes near the surface, so that an annual mulch of humus is beneficial. We grow it on the north side of the house, protected by overhanging eaves, so that it seldom gets much rain and the sun only reaches it in late afternoon during the summer months.

*Adiantum raddianum* 'Gracillimum' is an exceedingly dainty form known since 1874, not sufficiently hardy to be grown outdoors here all the year, but very worthwhile if planted in a shady spot for the summer, then returned to a cool greenhouse for the winter. The new growth has a pinkish tinge; the frond eventually reach about 10 inches in length and are very finely divided into minute segments.



Fig. 8  
*Polystichum polyblepharum* (p. 41)  
Sylvia Chelsey Smith



## FROM BRISTLES TO FRINGED-EYELIDS NAME GIVES FERN A NEW IMAGE

Otis Hyde, Tacoma, Washington

*Polystichum polyblepharum* is its new name, but in the trade it will probably be found for some time under its old name, *Polystichum setosum*. *Setosum* means beset with bristles.

By either name, it remains a handsome, distinctive fern. Grown either in a pot or in the ground, a new one-and-one-half feet in height, it is a credit to the genus *Polystichum*. The name *Polystichum* means many rows and refers to the stitch-like rows of sori edging the backs of the mature fern fronds. The sori, or spore cases, are clearly visible to the naked eye. They look exactly like rows of little brown stitches on the edges of the frond backs.

*Polyblepharum* means fringed-eyelids and refers to the brown hairs on the frond. The hairs of the stipe (or stem) match those of the scales and hairs on the pinnules and pinnae (divisions) of the blade of the frond.

Due to the abundance and overlapping of both the pinnae and the pinnules, each frond is individually handsome. The leathery texture is enhanced by the glossy dark green appearance of the upper surface of the fronds. That surface, combined with the brown fringe and light green of the reverse side, form a beautiful foil for almost any other plant.

One of the most intriguing features of this fascinating fern is the appearance of its fiddleheads. Instead of emerging in a tight rounded form of a bishop's crosier, as do most ferns, it grows straight up, but then bends down in a loose tassel covered with almost white hairs. It looks sadly in need of water. This is, however, its natural pattern of growth. The white hairs become brown and the tassel straightens into its robust form.

*Polystichum polyblepharum* is hardy in the Pacific Northwest west of the Cascades. When it was first introduced to the area, it was grown inside as a house plant or under glass. It was far hardier than the early growers thought. It can stand strong light and will tolerate some sun. It requires only moderate watering, but it should not be allowed to dry out. It grows in any loose, well-drained soil or soil mix. When the new growth is mature, the old growth should be cut back.

Because of its glossy, light-reflecting fronds, this fern can be used to bring light into a dark area in the garden. It will furnish highlights in an area planted totally in ferns. Its strong form and the leathery substance of its frond, give it enough visual weight to be used near tree trunks, large rocks, or garden ornaments of stone, wood or heavy ceramics. It can repeat the light of still or running water near it. Its green and brown color combination makes it useful as a transitional material between plants of diverse foliages and sizes.

*Polystichum setosum*, beset-with bristles, as it was, has interested many plant lovers. Surely no one now can resist the charms of a fern with brown, fringed eyelids.

## FERN COLLECTING EXPERIENCES IN MEXICO

Dr. Irving W. Knobloch, East Lansing, Michigan

(Dr. Irving Knobloch, who is known to many of us as co-author of Ferns and Fern Allies of Chihuahua, was a participant in the Trinidad Fern Foray, described elsewhere in this issue. One evening, when we were without electricity, he delighted the group with a candlelight talk reminiscing on his mining and plant collecting experiences in Mexico in the 1930's. He has graciously agreed to share some of his adventures with our Horticulture Northwest readers... Sue Olsen)

I have been a member of the American Fern Society for 53 years and was interested in ferns before that time. Ferns were always a hobby with me and I pursued these beautiful "creatures", even though I was essentially a plant anatomist by training. Why not study the anatomy of ferns then, the thought occurred to me, and this I did. To do a creditable job, I was forced to delve into fern taxonomy and cytology, because research on mis-named plants is of no use to anyone.

There is only so much time available to one and I was forced to concentrate on native ferns, but how I envy those of you who can name the hundreds of species and cultivars in *Adiantum* or *Nephrolepis*. To come back to collecting, many of you have ventured south in search of native ferns and know the difficulties in "bringing them back alive". I do not know how many fern collectors have ventured into Mexico, but my book on the PLANT collectors of Mexico, published in 1983, lists over 4,000 personal names. The purpose of my collections was centered around the publication of a book called Ferns and Fern Allies of Chihuahua, which I did with the late Dr. Donovan Correll. Of course, I gathered specimens in many other states, such as in Nuevo Leon where, among others, one new species was found and a very rare *Pellaea* was rediscovered.

The idea that Chihuahua is one vast desert will bring a laugh to those of you who have taken the railroad that starts at either Chihuahua City or Los Mochis and goes through some very mountainous areas, well-forested and containing some of the largest canyons in North America. Although the forested areas of Mexico contain the largest number of fern taxa, yet even in the drier parts, one finds abundant species of *Cheilanthes*, *Notholaena*, *Pellaea*, and *Selaginella*, especially if one looks on the north side of rocks (which usually have some moisture at their base).

Our experiences in Mexico started in 1937 when I visited my wife's family at a silver mine locale known as Mojarachic. So intrigued was I with the scenery and ferns, that I returned in 1938 to work at the mine and stayed there until 1940. After gaining my Ph.D. in 1942, I returned a number of times with grant assistance to collect material for the aforementioned book. In the 1930's, neither the railroad nor the roads were as they are today. We would start from the city of Chihuahua and get off the train at San Juanito, some 230 miles distant, dead tired after the 12 to 14-hour ride. We arrived after dark and, without flashlights, were led to some sort of boarding house.



It was pitch-dark and we were trembling. After a meal of questionable character, we boarded a truck which lurched us the rest of the way to the mine, only 30 miles, but 8 hours of torture. As you might surmise, the road was 70 percent rocks and 30 percent rivers. It was not a rare occasion to have to sleep in a cave on one side of the river until about 11 o'clock the next morning, when the truck could cross.

My fern collecting had to be confined to weekends, because I had to oversee the office, check the payroll and, of course, descend into the mine each day clad in a pair of shorts and bearing a miner's lamp on my forehead. This aspect was quite dangerous because the bucket sometimes broke its moorings and you took a chance that you were not in it at such a time. Our food was cooked on a wood stove and our inside toilets were outside. When the Mexican Hat Dance struck, all we had was Enterovioforme. The super stopper, Lomatil, had not yet been compounded. We had running water of a sort. Outside the kitchen was a 50-gallon drum and a pipe led into the kitchen and a faucet was attached. Every day, our handy man went up the arroyo and dipped some ice cold water out of a spring on the hillside. This he dumped into the drum and--voila. One day I inspected the drum and found ten or twelve salamander larvae swimming briskly about in the drinking water. Fortunately, I collected them and they turned out to be a new species.

We had about 300 chickens, 2 ducks, 2 turkeys, 2 horses, and 2 peacocks; later we added a fine goat from which we extracted milk every day. Hawks found our chicken yard a veritable paradise. I could train a shotgun on a tethered chick, watch the hawk circle in, pull the trigger and--the chick was far away in the talons of the hawk. Worked every time.

Ferns and allies were everywhere there in the mountains; not tree ferns, but lesser taxa. Every weekend found us in the saddle in a different part of the area. The soil in which the ferns grew was volcanic in origin and very rich in minerals. Few grew far away from rocks, of which there were plenty.

Since there were no stores in our vicinity, we had most of our food ordered from Chihuahua City, about 260 miles and 2 days away. With this food came a newspaper which, after reading by the family, became mine. Being without blotters, corrugates and newspapers is not the proper way to preserve plants, so we ordered a bundle of old newspapers each week. However, most of my specimens were acceptable despite these drawbacks. On NSF-financed trips, I was better prepared and I traveled to many places in Chihuahua, such as Batopilas where the famous Dr. Palmer had been in 1885, to Mount Mohinora, the highest peak, two trips to the bottom of the Barranca del Cobre, one to the town of Urique at the bottom of the Barranca Urique, one to the Barranca Guerachic, and other places too numerous to mention.

The book on Chihuahuan pteridophytes, by Dr. Correll and myself, contains descriptions of 138 species, subspecies and varieties, as well as line drawings and keys. A few taxa have since been added and some names have been changed. About seven species are endemic and several of these were hard to relocate. A very delicate *Asplenium modestum* from the vicinity of Batopilas has been found only once (by Palmer) and I could not locate it when I was in Batopilas. I was thrilled to collect *Asplenium adiantum-nigrum* as it is rarely collected and is cospecific with plants in Eurasia and Africa. *A. exiguum* is also interesting in that it is also found in northern India and northern China. I would think that *A. exiguum*, *A. monanthes*, *A. trichomanes*, and *A. resiliens* might make good terrarium plants.

Of the 14 species of *Selaginella* in the state, the best known is *S. lepidophylla*, which curls up when dry and is widely sold. Being without roots, I wonder if these commercial plants are really alive? Dr. Correll first found two filmy ferns in a remote area; one was a *Hymenophyllum*, and the other a *Trichomanes*, rare finds indeed. He also located *Blechnum stoloniferum* at the northern edge of its range. Other rare ferns are *Marsilea mollis*, *Dennstaedtia distenta*, *Anogramma leptophylla*, *Bommeria subpaleacea*, *Pellaea longimucronata*, *Cheilanthes cucullans*, *C. mexicana*, *C. wootonii*, and *C. weatherbiana*.

Some may be intrigued to learn that many of the *Cheilanthes* species are triploid apomicts. This means that they have a chromosome number between that of a diploid and a tetraploid. Furthermore, they have functional sperms, but no archegonia and, thus, no eggs. The sporophyte arising from the prothallus is not sexually produced, but grows from the body of the prothallus itself. In xerophytic or dry areas, this method of reproduction is necessary because the films of water necessary for the sperm to swim to an egg are lacking (or rare).

I trust that I have given you some idea of what conditions were like in the 1930's, and have given you an appreciation of the pleasures and perils of collecting in northern Mexico. I must warn you that some places I visited are too dangerous, because drug plants are now grown there (opium and marihuana). It is always good to get all the information you need before you start out, such as gas, food and sleeping availability. To get the feel, one might take the train that goes through the heart of the Barranca country, boarding at either Chihuahua City or Los Mochis (3 times a week each way), and getting off at the Divisadero, staying at the hotel there, and spend a day or two walking around. You will find some ferns there, and also see the awesome Barranca Urique with the Barranca del Cobre just at the far edge. You may have to make hotel reservations. Get a prescription for Lomatil (stopper) and ducolax (starter), iodine the water there, or drink beer and take a large bag of snacks with you. You cannot drive to the Divisadero, I am told. You will see Tarahumare Indians, and also at the next town north known as Creel. Creel also has a hotel or two, and you will find ferns there if you walk out of town in several directions. Good luck.



WE'D LIKE TO USE YOUR TALENTS!

Come see the Center from the inside! Join our group of volunteer receptionists at the Center for Urban Horticulture. For information on training and schedules, call Becky Johnson at 543-8616. (If necessary, leave a message and she will return your call.) Looking forward to meeting you!





# NOHS NURSERY SNOOPER

NORTHWEST FERN NURSERIES

Pat Bender, Seattle, Washington

As a positive thinker, I have been trying to sort out my feelings about our April monsoons. As I shiver and sniffle, I try to be thankful that we have no drought, and, best of all, that we have THE IDEAL CLIMATE FOR FERNS. Not only the ideal climate, but several top spore nurseries to indulge our fancies and tickle our checkbooks. So, let's meet some new fronds.

As a starter, let's go to Sue Olsen's

FOLIAGE GARDENS  
2003 - 128th Southeast  
Bellevue, Washington 98005  
(206) 747-2998

Sue is a Connecticut transplant who began taking plant propagation classes in order to produce material for her Bellevue garden, and to provide herself with a hobby she could do at home. Having produced many lovely rhododendrons from seed, she needed plants to grow under them--thus, the fern interest began. Sue credits George Schenk's book, Rock Gardens, for her initial information, as well as inspiration. Her specialty is maidenhair fern, together with cheilanthes, but she grows innumerable other outdoor ferns, as well as a few indoor ones. A couple of unusual ones I saw were the Japanese climbing fern (strictly indoors), and a very special outdoor one, *Oryopteris crassirhizoma*. The latter was grown by Sue from spore brought by Roy Davidson from Japan. Indeed, growing from spore is the way Sue grows all her ferns. They begin life in closed, plastic boxes in her basement, progress to flats in another indoor basement area (complete with a piano, yet!), and then are set out in protected areas in the garden. Sue's nursery is about half mail-order, and half walk-in by appointment only.... Her catalogue has many helpful hints (such as growing cheilanthes under the eaves--now I can do it!), and a useful bibliography of the most useful fern books.

Now, let's journey to Queen Anne to Judith Jone's

FANCY FRONDS  
1911 - 4th Avenue West  
Seattle, Washington 98119  
(206) 284-5332

Here we have another transplant--this time from Arizona. Her mother had always been interested in plants, so Judith was exposed from an early age. When she married Clifford, he introduced her to "junking", and when they needed a place to put all their finds, what could be better than a Victorian house? And what better to grow in a Victorian house than the craze of the era, FERNS AND MORE FERNS? Judith began with many tropical plants, and then became interested in British ferns. She joined several fern societies, became interested in the historical perspective of fern collecting and growing, and began to send for and sow spore. (This spore sowing seems to be a contagious mania--I hope it does not rub off on me.) The ubiquitous spore is sown in

closed, plastic boxes, under light in the basement, and progresses to the greenhouse at a later stage. Her business is largely mail order, from an extensive catalogue, complete with bibliography and glossary. (And I thought "grandiceps" was something you got from exercise.) Judith's stock is mostly species and unusual things, especially the British ferns. The bread and butter fern plants are sown by her associate, Torben Barfod. Judith's interests are widespread, and she has travelled to Sikkim, England, and the eastern United States in search of material. I'm sure that, in a few years, her catalogue will be twice the size it is now.

Our third stop is

BARFOD'S NURSERY  
23622 Bothell Way  
Bothell, Washington 98021  
(206) 483-0205

Torben Barfod handles the retail and wholesale part of the business that he and Judith Jones operate. He is assisted by his lovely wife, Anna--a story in herself. They came from Denmark 28 years ago; Torben was in the nursery business there, too. When he first went into business here, he specialized in trees and shrubs. One fateful day, he met the Ferny Godmother, May Belle Johnson, who gave him his first start of ferns. Mareen Kruckeberg soon followed suit, and he was hooked. He began growing from spore and was successful in a big way. He grows over one hundred kinds of fern, and brings them on quickly from spore to saleable size by feeding them well, and by use of other growing techniques he developed over his long commercial nursery career. So much for the trees and shrubs, but Anna says that Torben has never been happier. He supplies many of the ferns for the NOHS Fern Sale. As a side note, Torben is descended from the Norwegian Vikings who settled the Isle of Man, and he has traced his ancestors back to 940 AD. So, attend the Fern Sale and buy a fern from a Viking.

Our fourth, and last, stop is

MSK NURSERY (Mareen Kruckeberg)  
20066 - 15th Northwest  
Seattle, Washington 98177  
(206) 546-1281

In the Winter 1985 issue of the NOHS Journal, I wrote about Mareen's remarkable nursery--a little of everything rare and lovely. I should, however, remind our readers that Mareen has a specialized collection of native and rare ferns. She is open for retail sales by appointment. And, don't miss the tour of her garden during the Fern Festival.





# BOOKS ON FERNS AND FERN-ALLIES IN THE ELISABETH C. MILLER LIBRARY

Laura Lipton, Librarian

1. Lellinger, David B. A Field Manual of the Ferns and Fern-Allies of the United States and Canada, Smithsonian Institution, 1985.

406 species, subspecies and varieties of ferns and fern-allies, native to or naturalized in Canada and the United States, are described in this thorough aid to identification. Most of the species are illustrated with a color photograph, taken in the field whenever possible. A glossary, illustrations, and many references to the literature, help to make this a most useful guide to the complex ferns and fern-allies.

2. Mickel, John T. How to Know the Ferns and Fern-Allies, Wm. C. Brown Co., 1979.

John Mickel is the Curator of Ferns for the New York Botanical Garden. He feels that finding ferns can be a challenging and rewarding pastime, and has designed this field guide to aid in rapid and accurate identification of the pteridophytes of North America, with hundreds of illustrations, maps, and descriptions.

3. Kaye, Reginald. Hardy Ferns, Faber and Faber Ltd., London, 1968.

Reginald Kaye has spent over 50 years growing hardy ferns, and has first-hand knowledge of 95 percent of the species he writes about. He describes and illustrates hardy ferns from all parts of the world, as well as providing information on propagation and cultivation.

4. Rush, Richard. A Guide to Hardy Ferns, British Pteridological Society, London, 1984.

This small publication could be used as a supplement to Kaye's Hardy Ferns. Rush feels that there are many species of hardy ferns that are more striking and distinctive than the easily obtainable and better-known species. He hopes to encourage fern growers to be adventurous with these lesser-known species by providing information as to which can be grown with a reasonable prospect of success. The book is not inclusive, but describes an overall variety of hardy ferns, with an emphasis on markedly distinctive species.

5. Foster, F. Gordon, Ferns to Know & Grow, See book review, page 52.



## SOME FERNS OF NEWFOUNDLAND

Bernard S. Jackson, The Memorial University Botanical Garden  
St. John's, Newfoundland

It seems to me that the average home gardener gives little thought, if any, to the use of ferns in landscaping. Their minds, more often than not, gravitate to the colour and form of showy flowering plants more so than they do to the delicate, subtle beauty of ferns. This is rather a shame for I think all of us could benefit from the sight of a few well chosen ferns tastefully positioned within our garden. In fairness, it should be mentioned that I, myself, should practice what I preach! Nevertheless, I have had some experience with these plants over the years, but only with a relative few of the forty-two species and approximately twenty-nine varieties or forms presently known to grow on the island of Newfoundland.

Generally speaking, I would say that the basic requirements of the ferns growing in my area are dappled shade and a moist, but well drained, organic soil. There are exceptions, of course, for, as we all know, there are ferns that grow without much shade or in very soggy conditions and others that thrive simply in small rock fractures or in other seemingly barren sites. The royal fern (*Osmunda regalis* L.), for instance, can often be found with its feet well submerged in the cold, blackfly infested water at the edge of fast-flowing streams, or amongst the boulder rubble of tiny islands that cause the riffles and small pools so beloved by brook trout. In such situations, their black, wiry roots will sometimes so engulf a fair-sized rock that it would be extremely difficult to extricate it. Yet, so long as it is never allowed to get dry, this fern will happily settle down in a rich, organic soil well away from water. The same can be said for that other wet ground species, the sensitive or bead fern (*Onoclea sensibilis* L.). If carefully handled, this fern will transplant quite readily. It would seem to get its name "Sensitive" from its susceptibility to frost.

A number of ferns are susceptible to late spring frost. In areas such as our botanical garden, where the cinnamon fern (*Osmunda cinnamomea* L.) is common, frosted young fronds of this species are a fairly regular occurrence. Indeed, though I have no consistent records, I would suggest that our cinnamon ferns are, more often than not, damaged by frost each spring. They are, nevertheless, robust plants and able to withstand full sun for much of the day, providing their strong, wiry roots have enough moisture. Although common, they have much to recommend them and certainly should not be overlooked when planning a woodland garden.

I am rather fond of the interrupted fern (*Osmunda claytoniana* L.). It is not particularly common in my area. Although it is said to prefer stony, dry soil, I find that it grows quite happily in the good organic soil of our woodland bed.

Incidentally, I have found that our three *Osmunda* ferns, along with our spinulose woodfern (*Dryopteris spinulosa* [O.F. Mull.] Watt) and lady fern (*Athyrium Filis-femina* [L.] Roth), behave very well in short indoor exhibits, providing that the root clumps are kept well packed in damp peat and a fair atmospheric humidity is maintained with a regular misting of cool, clean



water. I have dug them up, displayed them at horticultural exhibits, and then returned them home without them undergoing any apparent ill effect. It is important (certainly for display) and always difficult to handle and transport the larger ferns without letting their fronds bend over or snap completely. If you gently poke some thin sticks vertically down into their root mass, then carefully gather up the fronds and tie them within this framework of sticks with thick wool or soft twine before digging, you will have a good chance of arriving at your destination with undamaged plants. Ferns respond to gentle and considerate handling.

Our smallest fern is the curly grass fern (*Schizaea pusilla* Pursh). As an inhabitant of our acid peat bogs, it likes to keep company with such other small plants as the sundew (*Drosera* spp.), small cranberry (*Vaccinium oxycoccus* Linnaeus) and the diminutive types of sedges and such. It seems to like growing in a slight, less-densely vegetated depression. Whether this is because it is prone to being easily smothered out by the more aggressive flora or simply because, in such a site, it is somewhat easier to discover, is debatable. The plant is the very devil to locate--something akin to trying to find a brown coloured pinhead in a handful of coarse sand--it is possibly more widespread and common on our boglands than we suspect.

Not too long after starting the botanical garden fifteen years ago, a scientist friend brought me a piece of bogland turf in which nestled a single specimen of this little fern. The only sensible thing to do at the time, I thought, was to settle this one square foot of turf into the surface of a small bog that we hoped to soon include within our boundaries. In doing this, I also carefully marked-out the corners of the turf with four twigs. I managed, though with great difficulty, to relocate this plant the following two years, but then lost trace of it. Since these plants are little more than an inch in height, my specimen may still be there or, for all I know, may now be surrounded by dozens of its fellows. One of these days, I really must spend some time in this area. Maybe an hour or two on my hands and knees, nose brushing the bog, will result in something more positive than the expected strange looks from garden visitors!

Strangely enough, those two pretty ferns of our dank, acid coniferous forest, the long beech fern (*Phegopteris connectilis* [Michaux] Watt) and the oak fern (*Gymnocarpium dryopteris* [L.] Newm), have not yet shown an inclination to settle down for me. Though I have tried to grow them a couple of times and have placed them into what appeared identical type sites to that of their homeland, they have, after a couple of years, vanished like the morning mist. They are more usually found on the western part of our island than they are in my eastern area. Whether or not the warmer summers and more reliable snow cover of the west is of benefit to them is unknown to me.

A fern that I like very much and that is rare in Newfoundland is the maidenhair fern (*Adiantum pedatum* L.). It is, I gather, more of a forest dweller elsewhere but, here on our island, it is only found on the bleak, moonscape areas of our serpentine barrens. I do not know whether or not it favours the chemistry of serpentine soils or, like some other plants growing there, it has simply found a retreat from the competition of other, more aggressive flora. It seems to like to tuck itself into the shadow zones amongst large rock jumbles or against single boulders, especially if the ground close-in has extra moisture and trapped organic matter. It seems to me

that it would do well for us in a rock garden and, since there is a likelihood that we will soon extend our present alpine area to include some shaded slopes, this beautiful fern suggests a pleasant challenge for the future.

Two ferns that we have grown in our rock garden for years are the common polypody (*Polypodium virginianum* L.), and the green spleenwort (*Asplenium viride* Huds). Though both are shade lovers, the former can tolerate open situations, yet I must admit that it never seems to look as good exposed as it does peeking out from amongst the shade in a rocky crevice. Because our summers are cool and short in Newfoundland, many plants that would normally require shade elsewhere do not necessarily need it with us. This characteristic is often a surprise to botanists visiting our area for the first time.

The green spleenwort is usually found occurring naturally amongst the damp, shady, moss-filled ravines of our limestone areas. Such areas also offer the naturalist a chance to see some of our other less common ferns. Amongst these are the fragrant cliff fern (*Dryopteris fragrans* [Lindaeus] Schott), maidenhair spleenwort (*Asplenium trichomanes* L.), slender cliffbrake (*Cryptogramma stelleri* [S.G. Gmel.] Prantl), alpine woodsia (*Woodsia alpina* [Bolton] S.F. Gray), smooth woodsia (*Woodsia glabella* R.Br), and the bulblet fern (*Crystopteris bulbifera* L. Barnh). I cannot recall ever having found the latter three species, but this could reflect my lack of time spent in suitable habitat rather than suggest their particular status in Newfoundland. Also, I have only rarely run across the slender cliffbrake. On each occasion, its roots have been so well embedded in the finest of cracks on a sheer limestone face that it would seem only a charge of dynamite could set it free.

Two other ferns that I have grown are the New York fern (*Thelypteris thelypteridioides* [Michaux] Holub) and the Braun's holly fern (*Polystichum braunii* [Spenner] Fee). The former is quite common in our area and is, I think, particularly pleasing to the eye just after the young fronds have opened and are struck by a shaft of sunlight. To see the Braun's holly fern on our island, one must go west. I have found it, more often than not, growing amongst the boulder jumble at the base of forested mountain slopes, especially if such an area coincides with a fast-flowing, shaded, boulder-strewn stream. Small plants can be found growing in the thin felt of moss that often completely caps the tops of boulders, but the larger plants are usually established in the deeper, rich litter at ground level. This plant seems to respond to having some good-sized rocks mixed into its bed of deep leafmold and definitely responds to medium shade. It adds an interesting texture to the garden, especially as the clump of fiddleheads push up in spring.

One major problem with wanting ferns, or other less usual plants in one's garden, is how and where to get them. There are nurseries that sell some ferns, but not in my area. I would not want to encourage you to collect them in the wild for much of our planet's environment has been raped badly enough already and, when all is said and done, they are much better off growing where nature intended them. Nevertheless, an interest in ferns, whether in the garden or the wild, will add much to one's overall pleasure in life, and that surely is yet another positive characteristic of this fascinating group of plants.





## A TRIP TO TRINIDAD

Edna and Marshall Majors, Bainbridge Island, Washington

We had met Dr. John Mickel, the President of the American Fern Society, and the fern expert for the New York Botanical Society, several years before, when he was attending a botanical meeting in Seattle, and were impressed with his knowledge and personality. So, when Sue Olsen suggested that we might want to go with her to a ten-day fern seminar that Dr. Mickel was conducting in Trinidad in July of 1985, it seemed like a good opportunity to learn more about ferns, as well as the geography, flora and fauna of that part of the world. We left a few days early to spend some time with a niece in Tampa, and then flew from Miami to Port of Spain, Trinidad. We were met by a van and transported fifteen miles to the Asa Wright Nature Centre, a plantation which had been converted by its former owner into a non-profit nature preserve. The seventeen members of our group were housed in the main house and in very simple duplex cabins. Upon arrival, we were informed that the power lines supplying electricity to the Centre had been put out of commission by a storm and probably would not be repaired for several months. In the meantime, our only power was from a generator, which the manager turned off promptly at nine o'clock each night. And even that broke down during the last four days of our stay, leaving us without hot water or lights. Thank goodness the water system worked by gravity! But, in the tropics, cold showers and candlelight are not too bad. All our meals were served family style and tended to run to beef and chicken with beans, rice, spices and tropical fruits--nourishing and reasonably tasty.

At our first meeting, Dr. Mickel, who immediately became John, told us that we would be going on daily field trips and he hoped to show us two hundred different species of ferns growing in the wild. Actually, we found one hundred eighty-nine, including a big group of Boston ferns growing by the road. We never found out whether they were indigenous or had escaped from a local florist from Port of Spain.

We saw tree ferns and ferns that grew on trees. The sori of the tree fern *Chemidaria spectabilis* could have been stitched on by a sewing machine. And six different species of *Cyathea* were checked off our list. We craned our necks to see how far the five *Lygodium* and *Polybotria* we found climbed upward. Epiphytic ferns are plentiful in the rain forests of Trinidad. *Polypodium polypodioides* sat like so many roosting birds in many trees. And we were all excited to see our first *Asplenium serratum* high in a tree looking like the bird's nest from which it gets its common name.

We particularly enjoyed the bronze foliage of the banks of *Blechnum occidentale* that lined the road into the Centre. And we never tired of looking for new species of *Trichomanes* (Filmy Ferns) that grew on the roadside cuts. We found twelve. Other genera of much interest included *Adiantum*, *Displasium*, *Grammitis*, and *Thelypteris*.

Although we were there primarily to see ferns, one has to be impressed by the birds of Trinidad--both by their variety and beauty. We were taken to a cave right on the premises to see the rare oil bird (*Steatornis carapensis*).

We constantly heard the peculiar call of the bellbird (*Chasmorhynchus niveus*) whenever we were in the rain forest. And one of our highlights was a trip by boat to see hundreds of scarlet ibis flying in from the coast of Venezuela to roost in the mangroves of the Caroni Swamp.

Two days and one night were spent in a side trip to the neighboring island of Tobago, where we stayed at the Arnos Vale Hotel, a welcome change from the Spartan accommodations of the Centre. Although we continued to botanize for ferns, we most enjoyed the beach at the hotel and the trip on a glass-bottom boat out to the coral reef to snorkel and watch the tropical fish.

All in all, it was an outstanding trip. Our only regret was that we did not see a single rhododendron!

EDITOR'S NOTE: The Majors' have over 1,100 rhododendrons in their garden on Bainbridge Island.



BOOK REVIEW: FERNS TO KNOW AND GROW, by F. Gordon Foster, Timber Press, Portland, Oregon, 1984; 227 pages, 8½x11, Hardbound. Price: \$29.95.

F. Gordon Foster's interest in ferns dates back to 1948, when curiosity from his microscopical studies of fern spore led to research on the identificatino and cultivation of ferns for his New Jersey home and garden, and a book, The Gardener's Fern Book. Many of us are more familiar with his subsequent volume, Ferns to Know and Grow, in which he describes forty hardy ferns, twenty-seven tender ferns and twenty-six ferns to know from the perspective of the knower and grower living in northeastern United States. The book's format included descriptions and identification features with line drawings conveniently located on the same page, as well as some excellent diagrams--life cycle, types of leaves (his word), typical sporangia, etc.

Foster's updated version, also entitled Ferns to Know and Grow, has grown in both size and price. The former entries and useful features are reprinted, along with the original text. The black and white pictures, too, are from the former edition and have lost definition, detail and contrast in the reprinting. The color plates have been deleted.

The new version, however, includes new tables on the landscaping uses of ferns and has added thirty-nine species selected from southern and western U.S. natives, as well as a token sampling of non-U.S. species. Although no longer conveniently divided as "hardy", "tender", and "to know", many of the additions are approached from the "to know" perspective and are either dismissed as questionable garden subjects, or given restrictive garden marks. "Difficult unless natural growing conditions are carefully simulated" appears frequently.



I am truly delighted to have some of our west coast species acknowledged, albeit tentatively. (The difficult *Adiantum jordanii* is recommended, while *Polypodium Scouleri* is dismissed, and I will never consider *Athyrium filix-femina* [the lady fern], an "excellent" species.) Also, in order to serve as a truly comprehensive book, there must be a far more extensive listing of British, European, and Japanese species many of which are ornamental and fully hardy, even on the east coast (*Polystichum setiferum*, for example). I also believe it would be to the readers' benefit to have the work include synonyms and a bibliography.

It should be noted that as ferns become more popular, it becomes more difficult for a single book to serve the needs of individual growers. Foster's first chapter is entitled, "Getting Acquainted with Ferns", and the book serves that purpose quite adequately, and certainly gives the reader a choice of "Ferns to Know and Grow".

Sue Olsen

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BOOK REVIEW: ENCYCLOPAEDIA OF AUSTRALIAN PLANTS SUITABLE FOR CULTIVATION, by W. Rodger Elliot and David L. Jones; Lothian Publishing, Melbourne, Australia; Volume 1, 1980, 336 pages, \$40.00; Volume 2, 517 pages, \$59.95; Volume 3, 1984, 516 pages, \$59.95; available in U.S. from International Specialized Book Services, Portland, Oregon.

Horticulturists in Australia are discovering, as we are in the Pacific Northwest, the great satisfaction of developing a truly regional pool of plant materials, their native plants. A series of books now in progress, Encyclopaedia of Australian Plants Suitable for Cultivation, reveals a diversity-taxonomic, functional, and aesthetic-of plants sufficient to fill any conceivable landscaping needs. The strength of this set, of which three volumes have appeared, does justice to its subject matter, with few major deficiencies.

Rodger Elliot and David Jones, the authors, are well traveled, botanically astute horticulturists. Elliot is a nursery operator who contributes regularly to "Your Garden" magazine. Jones also has founded a nursery and has co-authored several books.

Volume One, which appeared in 1980, is the introductory tome; it is divided into five sections, all concise, readable, and well illustrated: (1) Introduction and History of Australian Plants in Cultivation, (2) Selection and Cultivation of Australian Plants, (3) Pests, Diseases, and Other Ailments, (4) Propagation, and (5) Plant Lists. The first section discusses Australian biogeography, plant diversity, vegetation types, and history of cultivation, both in Australia and abroad. Our neighbors to the south may be surprised to learn that "Eucalyptus were planted spasmodically in California, until Elwood Cooper started a crusade to convert the barren state into a continuous forest of Eucalyptus trees" (p. 33)!

A discussion of Australian climate should precede the discussion of vegetation zones, thus making the latter much easier to interpret. When the climate treatment does appear, in Section Two, it is vague and only qualitative, without a map or discussion of the processes that contribute to the great climatic differentiation within Australia. The climate chapter and maps in the Sunset Western Garden Book, with their numbered zones, are a much better model in this regard. The remainder of Section Two, including information on soils, planting, and nutrition, is well done, as are Sections Three through Five. This first volume alone is enough to assure the set a spot on the bookshelves of serious horticulturists Down Under.

With Volume Two (A-Ca) begins the meat of the encyclopaedia, entries, arranged alphabetically by genus and species, of all cultivated Australian natives. Over 550 species of the genus *Acacia* are listed! Each species is described (with boldfacing to facilitate finding of information) and discussed in terms of native range and habitat, proper culture and propagation, and natural variation. In addition, one learns the meaning of the specific epithet, the family to which the plant belongs, its vernacular name, if any, dimensions of a mature individual, and flowering time. Good line drawings and excellent photographs accompany many entries; both the quality and quantity of illustrations improve in Volume 3 (Ce-Er).

As a plant systematist, I am grateful to see how diligent the authors are in keeping abreast of present-day taxonomic work on the Flora of Australia and in using currently accepted scientific names. They do this as a matter of course, without the whining one sometimes encounters in less sophisticated horticultural (and botanical!) publications.

The only additional bit of data I would desire in each entry is a numbered climate zone (or zones), for easy reference, in which the species is hardy. Knowing the native province tells one only so much, no more than knowing that a plant is native, say, to Washington. This returns to the set's lack of climate zone maps, comparable to Arnold Arboretum and Sunset maps, so indispensable to us in the U.S. Such an Australian map, with easy conversion to U.S. hardiness zones, could broaden the interest in Australian plants far beyond its own shores.

The set, at about \$60.00 per volume, is not cheap. It is a must, however, for horticultural libraries and for anyone seriously interested in the ornamental use of the Australian flora. It is also an excellent model for any comparable compilation undertaken anywhere in the world.

Dr. Clement Hamilton  
Center for Urban Horticulture  
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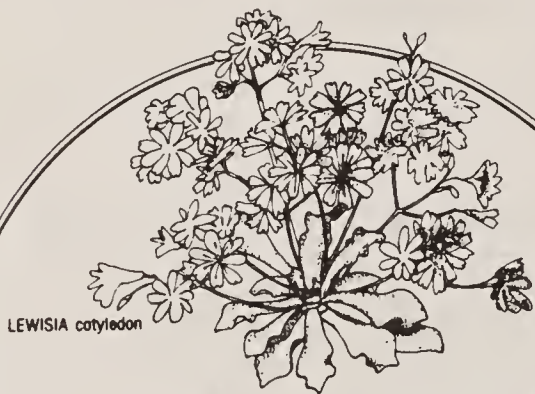
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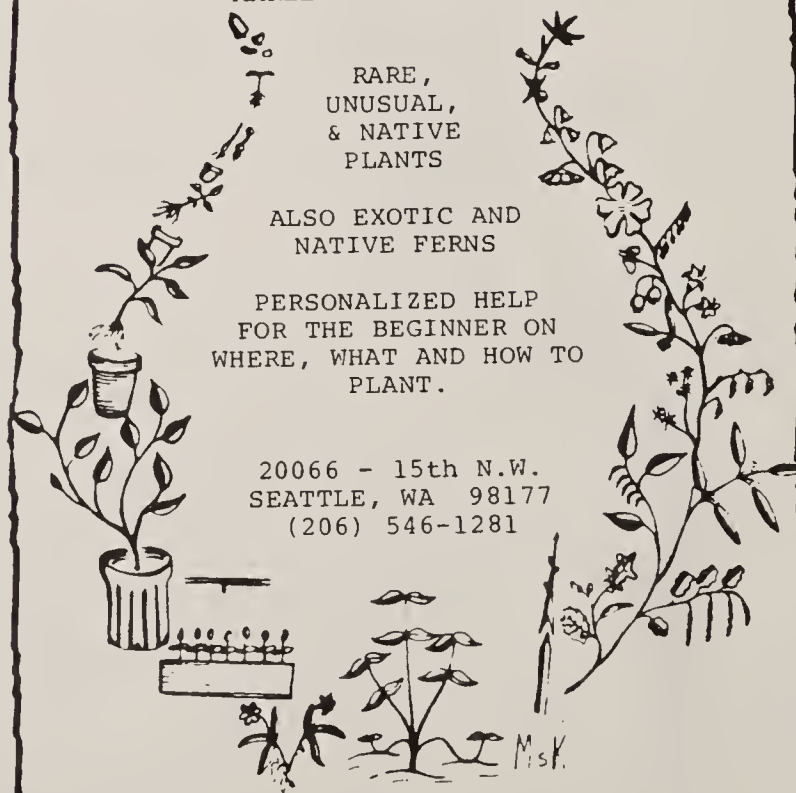
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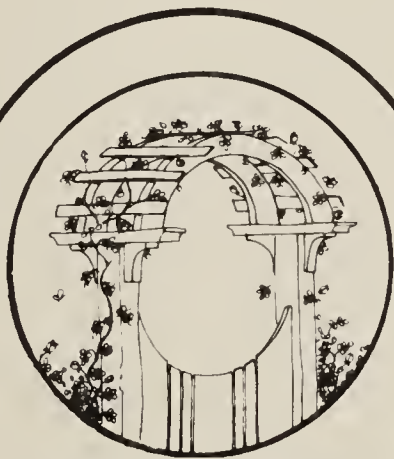
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